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EXAMINER	
OLSEN, KAJ K	

ART UNIT	PAPER NUMBER
1753	

DATE MAILED: 12/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/715,489	FILANOVSKY, BORIS	
	Examiner	Art Unit	
	Kaj K. Olsen	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 December 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) *15-25* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1-5-2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of group I, claims 1-14 in the reply filed on 12-8-2005 is acknowledged. The traversal is on the ground(s) that claims 23 and 24 are linking claims and should be considered as part of group I. This is not found persuasive because claims 23 and 24 clearly do not meet the definition of a linking claim. MPEP 809 states that a linking claim "usually either all directed to products or all directed to processes". This is not the case here because claims 23 and 24 are process claims (and merely dependent claims at that) while the claims of group I are product claims. MPEP 809 gives examples of appropriate linking claims (typically genus claims linking species claims or subcombination claims linking plural combinations) and none of these examples resemble the issue here where there are two process claims dependent from a non-elected invention that are considered appropriately linked to an elected product. Moreover, it is unclear how the applicant believes the examiner can examine claims 23 and 24 when these claims depend from a nonelected invention.

2. Applicant also urges that this invention is drawn to a single invention. The examiner disagrees. The inventive concept of claim 1 is unrelated to the inventive concept of claim 15. The applicant appears to believe these two concepts are independently novel and non-obvious by the fact that the applicant claimed these concepts in individual independent claims. The fact that these two inventive concepts might be utilized together in no way invalidates the requirement of a restriction between them. For these reasons, the examiner will not consider claims 23 and 24 as being linked to the invention of group I. Furthermore, the requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 10-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 10 has a limitation drawn to choosing the electrolyte to "minimize background current resulting from oxygen reduction". This limitation is merely a process step and it is entirely unclear what electrolytes (other than the explicitly listed electrolytes of the specification and claims 13 and 14) would meet this limitation. How would one possessing ordinary skill in the art know if their choice of electrolyte read on the unspecified electrolyte of claim 10? Moreover, it is unclear how to interpret the "minimize" of the claim because this term implies a true minimum in the background current and all the applicant appears to have done is find some solvents that provide better background currents than previous solvents in the art. Looking at fig. 2, all the examiners sees is an *improvement* in the background current. How do we know that this is a true minimized background current? Presumably, there could exist a solvent that provides an even better background current than the solvents of claims 13 and 14. In such a case, the solvents of claims 13 and 14 wouldn't even read on the literal claim requirement of claim 10. Hence, although the applicant claims the use of an electrolyte that *minimizes* the background current, all applicant appears to have support for is the mere *improvement* in background current. This renders the claim additionally indefinite because how would one

possessing ordinary skill in the art know if their choice of solvent were infringing on the claimed electrolyte of claim 10.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 6 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Wang et al (Analytica Chimica Acta, 361, 1998, pp. 85-91) (hereafter "Wang-1").

8. Wang-1 discloses an electrochemical assay for nitro-aromatic compounds comprising a working electrode having a surface that has been modified by treatment with a chemical modifier to improve the electrodes performance. In particular, Wang-1 discloses soaking the working electrode in nitric acid (see section 2.1), which results in an enhancement of the TNT signal (see p. 87, col. 2, ll. 11-14). Hence it would appear that the nitric acid soaking has resulted in a chemical modification of the electrode surface and the increase signal to noise evidences that the electron transfer properties of the electrode have been improved.

9. The electrode of Wang-1 is carbon.

10. With respect to the electrolyte, see p. 86, col. 2, first full paragraph. With respect to this electrolyte being "chosen to minimize background current resulting from oxygen reduction", this is merely a process of making limitation and process limitations do not further limit the product itself. Furthermore, as the examiner explained in the 112 rejection above, it is impossible to

determine what the scope of this claim even is. Hence, the examiner will tentatively interpret the solvents used by Wang-1 as reading on the electrolytes of claim 10.

11. Claims 1-3, 6, 10, 12 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Naal et al (Analytical Chemistry 2002, 74, pp. 140-148).

12. Naal discloses a nitro-aromatic assay that comprises a working electrode that has had its surface modified by a chemical modifier (combination of an electropolymerized film (PPB), a maltose binding protein (MBP) and a nitro reductase (NR)) that increases the electron transfer kinetics of the nitro-aromatic compounds. See the abstract and fig. 4.

13. The chemical modifier includes an amino-aromatic molecule (see top portion of fig. 4).

14. With respect to the composition of the electrode, Naal utilizes a glassy carbon electrode (see "Instrumentation" on p. 142).

15. With respect to the choice of electrolyte, Naal relies on a solvent containing acetonitrile. See discussion bridging pp. 143 and 144.

16. Claims 1-4, 6 and 10 are rejected under 35 U.S.C. 102(b) as being anticipate by Xu et al (Analyst, 2000, 125, pp. 1453-1457).

17. Xu discloses a gold electrode that is modified by exposure to a solution of o-phenylene diamine. See "Electrode preparation" on p. 1454. In particular, Xu forms a thin layer of an poly-amino-aromatic compound on the electrode itself. In view of the applicant's own evidence that a modification of an electrode with an aromatic organic compound (claim 2), and amino-aromatic compound (claim 3) and the particular use of phenylene diamine (the same compound utilized by Xu) increases the electron transfer kinetics for nitro-aromatic compounds, the polymerized form of phenylene diamine is also interpreted as meeting the chemical modifier

limitations of claim 1. Furthermore, even if the examiner were to construe the polymerized form of phenylene diamine as not meeting the electron transfer limitations of claim 1, the examiner notes that the instant invention relied on the mere short term exposure of a gold or carbon electrode to a solution of nitro-aromatic species, like phenylene diamine. See p. 8, ll. 19-21. Hence the mere short term exposure of electrodes to solutions like those of Xu before polymerization (see "Electrode preparation" on p. 1454) would apparently meet the claimed electrode of claim 1. With respect to Xu being an assay for nitro-aromatic compounds, that is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability.

18. With respect to claim 10, see the previous discussion of claim 10 above (both the 112 rejection and the rejection relying on Wang-1). The solvents relied on by Xu are tentatively interpreted as anticipating this unclear claim.

19. Claims 1-3, 5, 10 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Ye et al (Analytical Chemistry, 1988, 60, pp. 1979-1982).

20. Ye discloses a platinum electrode that has been modified by exposure to a solution of aniline. See "Working Electrodes" on p. 1980. In particular, Ye forms a thin layer of an poly-amino-aromatic compound on the electrode itself. In view of the applicant's own evidence that a modification of an electrode with an aromatic organic compound (claim 2), and amino-aromatic compound (claim 3) and the particular use of aniline (the same compound utilized by Ye) increases the electron transfer kinetics for nitro-aromatic compounds, the polymerized form of aniline is also interpreted as meeting the chemical modifier limitations of claim 1. Furthermore, even if the examiner were to construe the polymerized form of aniline as not meeting the

electron transfer limitations of claim 1, the examiner notes that the instant invention relied on the mere short term exposure of an electrode to a solution of nitro-aromatic species, like aniline. See p. 8, ll. 19-21. Hence the mere short term exposure of electrodes to solutions like those utilized by Ye before the commencement of polymerization (see "Working Electrode" on p. 1980) would apparently meet the claimed electrode of claim 1. With respect to Ye being an assay for nitro-aromatic compounds, that is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability.

21. With respect to claims 10 and 12, see the previous discussion of claim 10 above (both the 112 rejection and the rejection relying on Wang-1). Furthermore, Ye utilized acetone in its electrolyte (p. 1980, col. 2, first full paragraph), which is an organic dipolar solvent.

Claim Rejections - 35 USC § 103

22. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

23. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ye in view of Xu.

24. Ye set forth all the limitations of claim 6, but did not explicitly recite the use of either a gold or carbon electrode. The previously relied on Xu taught that electropolymerization can be performed on a gold electrode. See "Electrode preparation" on p. 1454. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Xu for the electrode of Ye because the substitution of one known electrode material

for another known electrode material in electropolymerization requires only routine skill in the art.

25. Claims 6, 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ye in view of Shi et al (USP 6,356,433) and optionally Ko et al (USP 4,895,620).

26. Ye set forth all the limitations of claims 6 and 9, but did not explicitly set forth the use of gold or carbon at the working electrode. Shi teaches in an alternate electropolymerization process that carbon paper may be utilized as the electrode material. See col. 3, l. 66 through col. 4, l. 15. Carbon paper would be considerably cheaper than the platinum of Ye and it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Shi for the polymerization of Ye in order to make the set forth sensor less expensive.

27. With respect to claim 7, Shi does not explicitly set forth that the carbon paper comprises submicron particles. However, Ko teaches that carbon paper constructed with submicron particles provides a carbon paper with high particle retention and low surface resistivity. See col. 8, ll. 31-56. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize submicron carbon particles for the electrode of Ye and Shi in order to take advantage of the high carbon retention and low surface resistivity.

28. Claims 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu in view of Shi and optionally Ko.

29. Xu set forth all the limitations of claim 9, but did not explicitly set forth the use of carbon paper at the working electrode. Shi teaches in an alternate electropolymerization process that carbon paper may be utilized as the electrode material. See col. 3, l. 66 through col. 4, l. 15.

Carbon paper would be considerably cheaper than the gold of Xu and it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Shi for the polymerization of Xu in order to make the set forth sensor less expensive.

30. With respect to claim 7, Shi does not explicitly set forth that the carbon paper comprises submicron particles. However, Ko teaches that carbon paper constructed with submicron particles provides a carbon paper with high particle retention and low surface resistivity. See col. 8, ll. 31-56. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize submicron carbon particles for the electrodes of Xu and Shi in order to take advantage of the high carbon retention and low surface resistivity.

31. Claims 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang-1 or Naal in view of Bennetto et al (USP 4,970,145).

32. With respect to claim 7, Wang-1 and Naal set forth all the limitations of the claim, but did not explicitly recite the use submicron particles for the electrode. Bennetto discloses carbon powders utilized in the electrode art are conventionally submicron in size. See col. 6, ll. 6-14. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Bennetto for the electrode of Wang-1 or Naal because the use of conventional sized carbon particles already known from the electrode art requires only routine skill in the art.

33. With respect to claim 9, see the Bennetto abstract.

34. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Xu in view of Glass (USP 5,296,125).

35. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ye in view of Xu as applied to claim 6 above, and further in view of Glass.

36. With respect to claim 8, although Xu (or Ye in view of Xu) teaches the use of gold, it doesn't suggest that the gold is in the form of a coating. Glass teaches that gold electrodes are often provided as gold coatings on top of other metals. See col. 9, ll. 56-58 and col. 14, ll. 52-62. One possessing ordinary skill in the art would recognize that a gold coated electrode like that taught by Glass would provide the desired functionality of gold desired by Xu (or Ye in view of Xu) at an electrode surface at a much lower cost (i.e. a coating of gold would be cheaper that a whole electrode constructed of gold).

37. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wang-1 or Naal in view of Glass.

38. Wang-1 and Naal set forth all the limitations of claim 8, but did not explicitly disclose the use of a gold coating for the electrode. Glass teaches in an alternate explosives sensor that gold coatings find utility as an electrode material. See col. 9, ll. 56-58 and col. 14, ll. 52-62. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Glass for the electrode of Wang-1 or Naal because the substitution of one known electrode material for another requires only routine skill in the art.

39. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over any of Wang-1, Xu, Naal or Ye in view of Fukumoto et al (USP 4,696,184) with additional evidence from the CAPLUS record for Fukumoto.

40. The references set forth all the limitations of the claim, but did not discloses a mechanism for inputting air into the electrolyte to dissolve the desired measured component. All of these

various teachings were drawn to analyzing samples in a liquid environment. Fukumoto teaches in an alternate liquid based electrochemical sensor (more on this below) that said liquid based sensor can be configured to monitor constituents in air by having an air sample be inputting into the fluid that the electrochemical is housed within. See fig. 1 and 3 and col. 1, ll. 25-45. This allows a liquid based sensor to be utilized to measure airborne constituents as well and it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Fukumoto for the liquid sensors of Wang-1, Xu, Naal or Ye so as to extend the utility of the sensors to airborne constituents.

41. With respect to Fukumoto being an electrochemical sensor, although the document itself does not explicitly refer to an electrochemical sensor, the CAPLUS record for this document suggests that the sensor of Fukumoto was an ion-selective electrode. In fact an oral translation of the JP 61-147,156 document revealed that the sensor was described as an ion "electrode meter".

42. Claims 12 and 13 (and claim 10 in the alternative) are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang-1 in view of Wang et al (Analytical Chemistry, 2002, 74, pp. 1187-1191) (hereafter "Wang-2").

43. Wang-1 set forth all the limitations of claims 12 and 13, but did not explicitly disclose the use of any of the set forth electrolytes. Wang-2 discloses that it is conventional to dissolve samples like TNT and DNT in acetonitrile. See "Chemicals" on p. 1188. Because acetonitrile was already known as a suitable solvent for dissolving the samples analyzed by Wang-1, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the solvents of Wang-2 for the assay of Wang-1 because the substitution of one

known solvent for TNT and DNT for another known solvent requires only routine skill in the art. As discussed above, acetonitrile is an organic polar solvent.

44. With respect to claim 10 in the alternative, because acetonitrile appears to meet the electrolyte of claim 10, then claim 10 is rejected in the alternative over the further teaching of Wang-2.

45. Claim 14 (and claim 10 in the alternative) is rejected under 35 U.S.C. 103(a) as being unpatentable over Wang-1 or Naal in view of Peyton (USP 5,762,808).

46. The references set forth all the limitations of the claim, but did not explicitly disclose the use of any of the set forth solvents of claim 14. However, Peyton teaches that DNT is readily dissolved in ethanol. Furthermore, Peyton teaches that an ethanol solution of DNT mimics wastewater from the manufacturing of DNT. See col. 10, ll. 32-38. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize ethanol as taught by Peyton as an electrolyte for the sensors of Wang-1 and Naal in order to analyze the release of nitrotoluenes from manufacturing facilities. Furthermore, because ethanol is a conventional readily available solvent, the mere substitution of one known solvent for another known solvent requires only routine skill in the art.

47. With respect to claim 10 in the alternative, because ethanol appears to meet the electrolyte of claim 10, then claim 10 is rejected in the alternative over the further teaching of Peyton.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (571) 272-1344. The examiner can normally be reached on Monday through Thursday from 5:30 A.M. to 3:00 P.M. and on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen, can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AU 1753
December 22, 2005

KAJ K. OLSEN
PRIMARY EXAMINER